

SO YOU ARE HAVING DRIVE TROUBLE...

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So after only three years of daily use your Micropolis drives are giving you trouble...what do you do???  
The answer is that even if you are not particularly technically inclined, you can do a lot!!

FIRST, MAKE SURE YOU HAVE A DRIVE PROBLEM.

In a disk-based system, it is only natural to blame the disk drives for anything that goes wrong...but have you tested your system's memory? On a Vector Graphic System B, you have a built-in memory test available from the Monitor. Simply type:

Mon>TEST 0000 DFFF           for a 56K system  
...or: Mon>TEST 0000 BFFF       for a 48K system

You should get only dots on the screen, indicating that the test found no defective memory locations.

Another very effective way to test your system's memory is to use the DISKCOPY program you got with your MDOS operating system. It does not matter what you are copying, but be sure to use each drive in your system as the source drive and as the destination drive at least once. Use the same source and destination disks for all tests so that you can duplicate your experiment later.

DISKCOPY reads each sector of the source disk, checksums it, and compares it with the recorded checksum. If all looks OK, it puts the data in memory, and continues this process until all of your contiguous system memory is filled with data. Then the memory image is checked for correct checksum, and MEMORY ERRORS are reported. If all is still OK, the data is written from memory to the destination disk, read back on the next revolution, checksummed, and compared byte-for-byte with the memory image. This program will thus exercise and test nearly all critical parts of a dual-drive system during the copying process.

Defective memory can manifest itself in a number of ways, including:

Scrambled directories  
Failure to make valid copies  
Tendency to spontaneously select a drive  
Very slow system operation  
Garbage on terminal screen and/or disk  
System "goes away"  
System doesn't "understand" you - displays wrong keys, etc.  
Certain programs won't run - others are fine.

If problems are experienced copying and you are running CP/M, always try copying the entire disk with MDOS: the error recovery in CP/M is nowhere near as extensive as in MDOS, and you will be more likely to end up with a meaningful error message using MDOS.

OK - IT'S NOT MY MEMORY

But you said your system is three years old! Have you ever cleaned the dust out of your mainframe or drives? Is your equipment being used as a nice warm home for spiders, mice, or assorted other varmints? (I wouldn't ask you if I hadn't seen all these things before...)

You can safely clean most of the dust out of your (unplugged) system components with a blast of air from a bicycle pump, vacuum cleaner, etc. Just exercise reasonable care around loose parts (why are they loose?), and don't loosen any with the air (you don't have to use a blast that strong). For those of you who are married (and intend to remain in that condition for awhile), I strongly recommend conducting the cleaning operation in the garage, (unfinished) basement, or somewhere other than in the living room.

For the layer which will not blow off, it is safe to use Isopropyl Alcohol on virtually all electronic components. Just make sure that the item is thoroughly dry before you apply power again. Exception: DON'T get Alcohol or any other liquid on your drive's pressure pad!! If you do, the pad MUST be replaced (if you cheat, the contaminated pad will "eat" your diskettes). Also, it is not good to add alcohol to any grease you want to keep, such as that on your drive's leadscrew. Don't forget to clean your S-100 cards' edge connectors. You should use Isopropyl Alcohol here, too. If the card gets dirty immediately after you put it back in the chassis, clean it again and put it back in the same slot: repeat until you have cleaned out that slot (you can't put solvent in most edge connectors - they won't drain). Now I know that you all have heard of the eraser trick, but you should only use a RUBY (Eberhard Faber). Most other erasers are too hard, and will remove the thin gold plating from your cards! You shouldn't ever have to use ANY eraser often - if you do, something else is wrong.

Another thing to check is your power supply. You must have +8 volts (I like it set to 9-10) and +16 volts (I prefer 20-22) in order for your 1015 drives to operate. Your S-100 Micropolis "FD Controller B" card needs only +8 volts.

#### I STILL THINK ITS MY DRIVE:

Have you EVER had your drive aligned? The vast majority of drive problems are due to lack of a thorough alignment by a trained, competent service organization: only rarely is something actually broken. And was your drive aligned when you bought the system? If your dealer gave you your system straight out of the box, the answer is almost always NO. Vector Graphic, in particular, always emphasized that drive alignment was the dealer's responsibility.

Don't forget your S-100 Controller...it needs alignment, too. Look at the three potentiometers at the top of this card. Do they have Loctite (Blue or Red substance) over the adjusting screws? If not, this card may have NEVER been in proper alignment.

#### LOOK FOR CLUES...WRITE THEM DOWN:

Do your diskettes show signs of wear? Are any of them scratched? If so, you MUST clean the heads of your drive to prevent propagating the damage. Your head load pad should also be replaced, as it probably is full of iron oxide. Don't continue to use diskettes with visible scratches - they just get your head and pad dirty all over again. Copy your the data to a new disk (if you have trouble, use DRECOVER - it's amazingly effective), grit your teeth, and throw those worn or scratched diskettes out.

Won't boot? Well, before you get your original master disk out of the basement safe and put it in that drive, you had better check for scratches, crimped center hole, memory problems, etc. before you feed that unit your last backup. On a dual disk system, swap drives to help narrow down the problem (don't forget that the terminator pack belongs in the drive at the END of the cable - regardless of its select code).

If crimping is a problem, remember that the vast majority of centering problems on Micropolis Drives are due to a misadjusted Door Open Switch: NOT the Centering Cone! I like to set the Door Open switch so that the drive motor turns on with the slightest downward pressure on the door - yet consistently turns the motor off when the door is open. The spindle must be turning before the diskette hits it, so that it literally screws itself into the center of the diskette. Improper centering can look like misalignment, or can make a drive "picky" about which diskettes it will operate with.

Most other "won't boot" problems are Radial Alignment, Circumferential Alignment, or Read Amp Gain adjustment problems. I like to set the read amp gain a little higher than the maintenance manual says on Track 0: 1.5 mv. to 2.0 mv. Then I check the gain at Track 76: it should be just 1.0 mv. unless something else is wrong.

Can't write data on inner tracks? Does the drive work with certain diskettes only...or only at certain times of day? Check the motor speed. By the way - are you SURE the motor is turning? Drive motors DO wear out, especially on the older drives: usually after 2-3 years of daily use. This syndrome could also be Read Amp Gain or a worn pressure pad.

LISTEN to your drive. Does it purr like a kitten? It should. If it growls, it probably needs either azimuthal alignment or Positioner Step Timing adjustment or both. Does it sing? Pressure pad replacement or pad pressure adjustment time! Sound like a broken roller skate? Spindle!

TIME your system's performance. If your system takes too much time to boot, copy files, or load programs it may indicate that your system is having to use an excessive number of retries to read data from diskette. This is probably an early warning of an alignment problem: get it corrected before you lose data.

#### WHAT YOU SHOULD EXPECT:

Micropolis drives are still unique in the industry. While other vendors have finally (nine years after the Mod II was born) been able to duplicate the quad density storage capacity, they have been able to do so only by use of imbedded servo techniques and TWO major diskette media improvements.

Micropolis' unique design results in vastly superior performance over a wide temperature range: the Tandon drives used in some Vector Graphic systems will not hold their alignment over a temperature range as small as 20 degrees Fahrenheit. This superior thermal design plus the early use of MFM recording; a solid, conservative controller design and multilevel error recovery software allowed Micropolis to achieve quad density recording even with single-density-rated media.

Your properly-aligned drives should be quiet, very easy on diskettes (a diskette will last over a year even spinning 40 hours per week), and able to read and write diskettes which are compatible with all

other Micropolis drives from 50 to 104 degrees Fahrenheit. Using INIT under MDOS, you should be able to format a quad density disk in 2 minutes. Using DISKCOPY under MDOS, you should be able to copy and verify a complete quad density disk in 4 minutes. Your system should take approximately 5 seconds or less to boot CP/M, MDOS, or OSM.

I have customers who have used their drives in a business daily for seven years - and they are still going strong.

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#### OF MAN AND MACHINE

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by Tom Brown  
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Everyone should have something for which to be thankful on Thanksgiving.

This year in that department I have my health, or most of it; a devoted family including a seven-year-old son who has determined - midway through second grade - that he knows infinitely more than his parents; a job which beckons to me each morning, along with many nights and countless weekends, and a computer which as of this writing I am just getting to know and love.

The computer does not actually belong to me - nothing with so many human qualities should "belong" to another mortal. If anyone can claim dominion over this marvel of modern technology it would be an associate of mine but I have access to it nearly anytime I desire.

Although they have very few moving parts, computers affect me like other pieces of machinery; they intimidate me. So they won't recognize my insecurities and capitalize on them, I endeavor to maintain a blase, self-assured demeanor although acting is not one of my greatest skills.

Machines, like politicians and used car salesman, must be looked straight in the eye at all times. With eye contact, they appear to do precisely what you want provided you understand their motives and inner workings. But once you turn your back on them, they will swiftly betray you without even a tinge of conscience.

Getting to know a computer's inner workings is not an easy task, I have discovered. The particular model to which I have access is supposed to be easily at the disposal of anyone, even those of us unschooled in computer technology.

Our computer was installed a week ago by a secretary from Princeton who plugged the terminal into the wall, connected a disk drive, explained how easy the unit can become a slave to the businessman, stacked some books and manuals on the desk and quickly departed back to Nassau Street.

Because of other commitments, I was not privy to the entire demonstration. A few days later, a crack engineer from RCA's Sarnoff Labs and I spent the better part of a Saturday morning attempting to get the machine to tell us some of what it had learned the day before. The only thing it would say was, "A:dk?"

Fortunately, one of my people who had been working with the machine happened in the door and showed us what it was all about. The crack RCA engineer went sadly away shaking his head while the gal demonstrated how simple it is to program a common mailing list into this monster.

I am happy to announce that I have now mastered that principle and as of this moment, I have 800 or so names, addresses and ZIP codes stored away somewhere in the bowels of a five inch floppy disk. I can call them all back at my command, one at a time or in various categories and I am very pleased with myself. So much for Step One.

I'm not exactly sure in which direction I should attempt Step Two but I could and really should be writing this piece on the computer. Among its many other attributes and talents, this particular model has with it a word processing system which is supposed to enable writers to produce sharp, justified, flawless copy that no editor would dare blue pencil.

The instruction manual for the word processing program, however, rivals "War and Peace" in sheer volume and "The Principles of Advanced Micro Surgery" in practice and technique. So despite the lure of a better mousetrap, I suppose I'll stumble along with my battered IBM Selectric for the time being.

I did spend an evening or two with the mailing list manual called "Datakeep" last week, prior to my first attempt at serious computing. I learned new meanings to a few words like "field" and "boot" and "sort" before slipping into a fitful sleep. When I faced the machine the following morning, I was stripped of

all knowledge and felt as if I were about to embrace the mighty Wurlitzer at New York's Radio City Music Hall.

But I have come a long way with my mailing list and hopefully, with a little practice and an electronics degree or two from M.I.T., the bookkeeping program may someday be within my grasp. Meantime, I am thankful for my health, my family, my job - and the little grey computer which has brought me face to face with several inferiorities - real and imagined - which I haven't enjoyed since my freshman year in college.

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#### LETTERS

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Buzz: Some comments on recent MUG newsletter items:

#### CP/M FILE CONTROL BLOCK (FCB)

An FCB is a block of memory whose address is passed to CP/M so that the operating system can retrieve and pass information about a file to an applications program. MDOS has FCB's, but they are created automatically by the file opening routine and are invisible to the user. As mentioned in my column, FCB's are "out" in the new MS-DOS calls, which are more like the way MDOS does things. MS-DOS still supports FCBs for backward compatibility, but their use is discouraged for new programs.

#### CP/M FILE EXTENTS

CP/M organizes files into "extents" containing 128 "records" of 128 bytes each, regardless of actual disk format. This can not be changed since it is the basis of CP/M's compatibility with almost any disk format. CP/M does contain a "disk parameter block" for each drive as part of the BIOS that describes the characteristics of the drive, the number of tracks allocated to the system, the size of the directory, etc. This information is used by CP/M to convert from physical disk drive specifications to its own internal 128 byte format. Languages like Microsoft Basic, which allow record sizes to be specified by the user, internally do blocking and deblocking to insulate the user from this restriction. Therefore, the answer to your question is "no", you can't write a BIOS that uses extents larger than 16K (128x128).

#### MICROPOLIS CP/M BIOS

Anyone wanting a BIOS for CP/M under Micropolis can contact Hawkeye Grafix, which used to have the BIOS available for sale with and without a Tarbell 8" disk controller driver built in. You'd better be a good assembly language programmer, however, since the source needs to be modified to run under the Vector Graphic assembler. I have the Micropolis/Tarbell version and it has run flawlessly for several years now.

#### CP/M PIP [V] OPTION

The [v] option in the CP/M "PIP" command verifies that the data written to the disk is correct by reading the disk back to see that it matches the data (still in memory) that was written. Yes, it does significantly slow down the transfer and is a waste of time if the BIOS is verifying too. Not all versions of CP/M under Micropolis do an automatic verify, however, since this is implemented by whoever wrote the BIOS.

#### BURNING PROMS

"Burning" a prom refers to the process of loading a programmable read-only memory chip with whatever data you want on it. It is done by special circuitry that writes to the chip at a higher than normal voltage called a "prom burner". I recall that before Vector Graphic started putting their monitor rom on the processor card they used a separate PROM card that had a prom burner built in (I think). Perhaps someone out there has the ability to burn a prom and doesn't know it.

#### VECTOR ROM

The Vector monitor ROM contains a translation table that converts certain key sequences to characters that aren't present on the keyboard. For example, a "control-[]" produces a backslash. The source for the monitor, which is included in the Vector documentation, shows that there is room for additional translations, but there is no way to change the Vector-supplied ROM since it is a non-programmable, factory-burned job. With a prom burner, the existing code could be patched to provide additional characters from the keyboard.

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Buzz: There are a lot of interesting things in the September MUG that I would like to comment on. I guess that I will just go through the issue in order.

#### CP/M FILE STRUCTURES

On the subject of extents and other good things like that: I think that anyone who is interested in the subject of CP/M should get the book "The Programmer's CP/M Handbook" by Andy Johnson-Laird (published by Osborne/McGraw Hill). This is the best book I have seen on the technical aspects of CP/M.

I have included a program on this diskette which I call LOADBIN. It uses File Control Blocks to manipulate files. It does not do anything special with extents other than zero them out. The purpose of this program is to convert a HEX file into a pure binary file so that it can be "burned" into an EPROM. I think that it is straight forward. I also give a complete description of the Intel HEX format in the listing.

#### CP/M INPUT/OUTPUT

Since input/output is one of the biggest problems people have when they first try to write programs in assembly language, I have also included a program module for console and disk input/output. There are two versions on this diskette. One is in the Zilog Z80 format (CPMIO.Z80), the other in the standard 8080 format (CPMIO.ASM). The LOADBIN program uses a modified version of this module and will serve as an example of how to use it. (ED Note: These files are available on MUG CP/M Library Disk 1911.)

The D.COM I sent to Herbert Spirer is from one of the many SDxx (Super Directory) programs floating around in the public domain.

#### VECTOR UPGRADES

On Vector upgrades. I have replaced my dynamic memory boards with the static RAM17 board originally made by Compupro but now made by the other Vector. When I pulled the Vector DRAM boards from my system I removed about 70 percent of the problems I was having. The advantage of this particular board (several others on the market are similar) is that it allows turning on or off the top 8K of memory in 2K blocks. In my Vector MZ system I have a 2K gap between E800H and EFFFH. With the RAM17 board that space is now filled with useable memory and it is where I load the patch for my 8 inch drive.

To change the Vector monitor ROM all you have to do is change the addresses and reassemble. Then program your EPROM.

#### MEMORITE

The CX command in Memorte III is used to convert documents from Memorte II to Memorte III. For people like me who still have some Memorte II files it is occasionally useful. Memorte II used an operating system and perhaps a disk format which was based on the old North Star system.

I have been using the mailing list program that comes with Memorte III. This program has some problems when it comes to output, but its internal workings are satisfactory. I always sort my lists into the order I need before I print them. I have used lists ordered by membership number, zip code, and alphabetical by last name. A good sort program should be able to whip through a list in a hurry and put it in the proper order for printing.

#### CP/M VECTOR BIOS

I got my copy of the Vector BIOS from another member of this group who has been a friend for some time. I do not know where he got it. I do not have any reason to think it is not an official copy since it has the name of the author, the date, and a Vector copyright notice. I presume it came from a dealer or software house who was making up for Vector's oversight.

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Buzz: Dr. A.H. Calvert of Surrey, England has written to inform me that there are at least two other BASIC's with the capability of executing a string as though it were a program line. (ED Note: See the April 1984 MUG article "A Tiny Calculator for Micropolis Basic.") One is the BBC BASIC which was commissioned by the British Broadcasting Corporation for educational purposes. It is marketed in ROM for 6502 based machines, but is also available as an interpreter for CP/M (Z-80) computers. He says that it runs extremely fast (about twice as fast as Microsoft's BASIC). The other is a BASIC marketed by Xytan called X-basic. The latter is available to run under CP/M-80 and CP/M-86 and features high precision BCD arithmetic and matrix handling statements as well as indirection.

The inclusion of an EXEC type instruction in any BASIC remains an enigma, to me at least.

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Buzz: I would like to address your Editorial Comment to Mr. Leary's piece on my open-files pondering.

#### CP/M FILE CONTROL BLOCKS (FCB)

Re: FCBs: To illustrate what a Disk Directory entry of a file looks like, I am also enclosing a copy of a printout from the .DOC file of Ward Christensen's public domain DUU.COM utility. This Disk Directory entry for the file is 90% of the Memory FCB of that file: CP/M writes that 90% of the Memory FCB to the disk as the Directory Entry upon CLOSING the file. (The only thing different from the FCB in that 90% on disk the 1st byte: the BDOS call to CLOSE changes that to an 00, 01, etc., to show that the file is active, not erased!)

#### DUU UTILITY PROGRAM

DUU.COM, incidently, is a program which permits you to examine the contents of a disk - to see what is on it, and where; and to do direct reads and writes to the disk if you want to, and many other things. DUU.COM was one of my tools and tutors in finding out what QBAX was doing to my disks.

#### QBAX BACKUP PROGRAM

I found QBAX to be DANGEROUS and IMPOSSIBLE TO RUN under Vector's CP/M 2.22H which my Vector Graphic 2600 uses. The Amanuensis people analyzed my problem, went to the BBDS for answers, and came up with no solution. They said this version of CP/M has violated the no-no land of the BDOS area of CP/M and that it does funny things with BDOS calls or routines.

I am happy to say that I was suspicious of QBAX from the start, and used some old scratch disks, as well as dedicated new disks, to let it run rampant so that I could examine its carnage! I never lost a single byte of valuable material in all of my testing. And it was DUU which permitted me to re-construct Directory entries which QBAX had wrecked. I have saved several disk files with DUU.

FCBs and the opening and closing of files, etc., is likely all or mostly done by the COM file code of the program which you are running (e.g., BASIC). One using a higher level programming language might not ever bump into the task of OPENing, WRITing and CLOSEing a file. It is 'transparent' as they say. But an assembly language programmer must include the code needed for these operations - at least to the extent of having his program make BDOS Function Calls to CP/M BDOS code modules which accomplish these tasks.

This DUU documentation illustrates disk file directory layouts and contents, showing where each byte (including the famous Extent and S1 and S2 bytes) is and what it's for. A FILE CONTROL BLOCK (FCB) is simply a 'Memory-located version' of that CP/M disk directory entry for one of the file's extents, with 1 to 4 additional bytes stuck on the end, and a different use of byte 00 - the 1st byte: in an FCB (Memory) entry, that 1st byte indicates the a: = Drive the file is located on - a fact that Memory needs to know, but one that goes without saying when entry is in the Directory on the disk itself! In the Directory entry, that byte No. 00 is used instead to tell whether the File has been erased (erased being indicated by having an E5 in that location), or whether it is an active file - 00, 01, etc. indicating active and indicating USER No. or Universal [00].

With DUU you can change such an E5 to a 00 etc. and thus UNERASE that extent of the file: but you must be sure, by getting a Disk Allocation Map readout, that the disk blocks which had been allocated to that Extent have not been re-allocated in the meantime to a different file!

In an FCB the 1st 'additional' byte (= the 33rd byte, being "No.32" since we started with No.00) is called "CR" - meaning Current Record count. Note that byte "RC", the 16th byte, means "Record Count", viz. the total # of logical (=128 byte) Records in that particular Extent which the FCB (or Disk Dir Entry) is showing us. In sequential reads/writes, CR will be decremented as each record is read, or incremented as each consecutive record is written to disk. The last 3 additional bytes that are carried on a Memory FCB are needed to perform 'random access' reads and writes.

Unfortunately, the nomenclature for these 32, 33 and 36-byte file information entries has not been standardized or logically developed: some refer to it as an "FCB" only when the In-Memory form is meant. The Directory Entry might better be called a "DFCB" for DISK or DIRECTORY file control block: that would be more precise and avoid confusion. "FCB" rather than MFCB could be retained for the Memory-located version, for that's commonly used as such in Assembly Language programming. Only CP/M (I think), not the assembly language programmer, is directly concerned with the Disk version of the entry - at least, in the usual cases.

As you might now guess, I have read a little more in my CP/M - Assembly Language library and decided that William J. Leary Jr.'s response to my FILE-OPEN suggestion was written from an assembly language programmer's point of view and that he was referring to some of the following facts of life (as I understand them to be) in the CP/M operating system world:

(1) The CCP of CP/M opens, reads and creates or loads a version of the Directory Entry for the first Extent of the .COM file which you invoked on your command line, loading into its own private FCB area somewhere some or all of the first 16 bytes of what is in the Directory Entry for that .COM file - i.e. bytes containing at least "d:fn.ft" and maybe even the next 4 bytes, viz. the Extent byte, bytes S1 and S2, and RC; and even more probably, loading ALL 32 bytes, viz. including the 16 Disk Allocation Blocks or 'Groups' which tell where that file is written on that disk. I assume the CCP then moves the .COM file into position in Memory (TPA usually beginning at 0100H) where control can be passed to that program so that it can begin to operate.

(2) Code in that file .COM file must make BDOS calls to get CP/M to execute its appropriate Function Number Routine to move the FCBs of any co-files which you had specified in your Command [e.g. A: BASIC CHKBOOK.BAS DEBIT.DAT ??] - as "It is up to the Programmer to move the FCB at 06CH out of the way before any disk activity takes place". (The .COM file code could move BOTH such non.COM FCBs to an entirely new area of Memory which the .COM program has reserved for FCBs.)

(2a) I'm unclear as to just when and where the FCB information beyond fn.ft gets written into Memory. Bill Leary says his assembly code usually calls for ZEROING all those FCB bytes to the right of the fn.ft in the top line, or the 1st 16 bytes of that FCB. That would mean all 16 top bytes got put into place, and the program then puts Zeros in the Extent, S1, S1, and RC spaces. FC tells how many 128-bytes logical records there are in or under the control of this particular FCB. If RC were 80H then there is likely at least one more Extent of the file. Upon the first disk read or write activity, the 2nd 16 bytes (= the disk allocation block numbers) must get read into the FCB.

(2b) As you will see from my notes on my QBAX testing, I have seen such FCBs or parts thereof up in BIOS, with room for 2 FCBs in one place and 4 or 6 in the other - those in the larger area often (or always?) replicating those in the smaller area. And QBAX itself had a FCB area reserved in its own code area of the TPA.

(2c) At any rate, the usual is to have only ONE extent (= 16K max. size) of a file FCB in Memory at one time - using up no more than the 33 to 36 bytes which will be needed to access and control read/writes to that section (=Extent) of the file. If you were to want a 2ND extent of the file open at the same time, Leary is saying, that will require another 32 byte area in Memory for a 2nd FCB to cover that extent. And if you went to even a 3rd extent, you would have to make the 32nd FCB byte a 2-digit one, I think: so it could indicate a Current Record number larger than FF = 255.

(3) The usual Memory FCB (= 'map') for a file thus contains information for only one Extent at a time - limiting the Computer's immediate 'map view' of the file to that one Extent (=16k map size) of it. Either the COM file or CP/M must contain code for making BDOS calls to go back to the disk directory to get the next 16 disk block allocation bytes for the next Extent(s) of the file when the program needs it. It would do that by simply reading in the whole 32 bytes of the Directory Entry for the next extent, I am sure - just as though it were a NEW file being accessed and read into Memory, EXCEPT that the Extent # of that entry must this time be SPECIFIED somehow, somewhere - so that the Read does not pick up that implicit 1st Extent again.

(4) Bill Leary seems to be saying that you might be able to re-write the code of your COM file (or perhaps provide some supplemental code somewhere) to have your program read in and operate with Memory FCBs for SEVERAL or all of the Extents of the file; BUT that the code would be tricky, bulky and a give other headaches.

The easier answer, as I see it, is to get a RAM-disk Drive and load all of your data files (and the program too, if you have room) into it each time you want to run the mailing list program. A SUBMIT program could accomplish the loading each time for you. A RAM drive that could retain its data with the power off (do CMOS static chips do that?) would be great! One that has its own separate power supply (as my PION does) would also be nice - so you could leave it plugged in to retain data when you turn the rest of the computer off. The battery backup feature is also most desirable for a volatile RAM drive.

With a Ram Drive and all your files on it, you wouldn't need to open all the extents of a file to speed up access: it would access them perhaps even faster than your trickier many- extents- open code could do, and have the added advantage of saving wear and tear on your mechanical disk drives with all that accessing.

The remainder of this letter is the excerpt from Ward Christensen's DOC file for the DUU.COM utility.

## INTERPRETATING DIRECTORY DATA - SINGLE DENSITY

The following explains the format of a CP/M directory entry as shown by DU, using either the "F" (find file) command, or just doing "D" (dump) of the directory sectors, which are located in groups 0 and 1 on a single density disk.

Sample result of "FSID.COM" command:

```
40 00534944 20202020 20434F4D 0000003A *.SID COM...:*
50 33343536 3738393A 00000000 00000000 *3456789:.....*
```

First line -

```
00 = file active
E5 = file erased          file size in sectors
/Other values (e.g. 03)   S1 /RC - record count
:: = User #              :: ::
40 00534944 20202020 20434F4D 0000003A *.SID COM...:*
:: :--- hex file name-----: :: :: :file name:
:: :                          / S2   in ASCII
:: extent EX
/
```

displacement of line in directory sector

Second line -

```
50 33343536 3738393A 00000000 00000000 *3456789:.....*
:----allocation group numbers-----: /
allocation groups just happened to be printable
```

## INTERPRETATING DIRECTORY DATA - DOUBLE DENSITY

The following is a sample of the DU command to find the file SID.COM, running on a double-density disk system.

```
:FSID.com
00 00534944 20202020 20434F4D 0000003A *.SID COM...:*
10 38003900 3A003B00 00000000 00000000 *8.9.:;.....*
G=0000:00, T=2, S=1, PS=0
```

The primary difference is that the groups now occupy 2 bytes, i.e. "38 00" "39 00" ... This follows the INTEL and CP/M convention of putting 16 bit values low-first. Thus it means group 0038, 0039, etc.

Note that in double density, each group stood for 2K, not 1K, so there were half as many groups for the same file.

Be VERY careful when patching a directory under double density. I once made the mistake of putting, for example:

ch10,38,39,3a,3b...

When I went to read this file, it tried to access group 3938, with resultant angry exclamations from the disk stepper at it attempted to go south to Peoria for the data.

Edward W. King, P.O. Box 787, Ithaca NY 14850

.....

WHICH VECTOR MODEL IS THIS?

=====

by Lou Woody, Sunrise Data Systems  
Suite 200, 100000 West 75th St., Shawnee Mission KS 66204

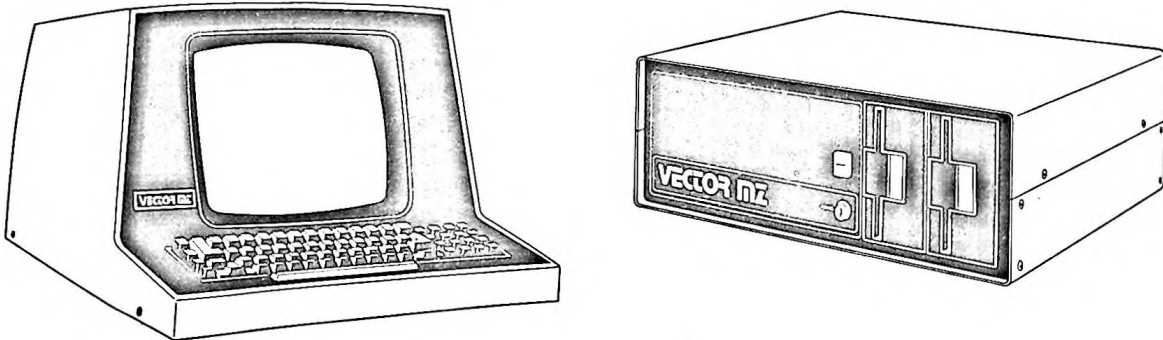
I have found, through experience, that many Vector Graphic computer owners do not actually know which model of computer they have. This occurs primarily because, in general, the model number does not appear anywhere on the system. Further confusion occurs if the original system was converted into another model or customized into a hybrid system in which some parts are Vector Graphic and some are from other manufacturers. This article should help the reader determine which of the "standard" Vector computer



models he has. As you have probably already determined, this knowledge is almost mandatory in obtaining parts and hardware/software upgrades.

In this article we will cover only those systems which are no longer in production. Soon I will write another which will describe the models which are currently being manufactured.

Below, you will find an illustration of a very common Vector computer:



If your system looks EXACTLY like the picture, then it is a "System B". This consists of the terminal on the left and the mainframe on the right. The mainframe enclosure is many times referred to as the "MZ" because of the label on the front. The mainframe contains the power supply, all computing electronics, and the disk drives. Vector has used two different 5 1/4-inch floppy disk drives. Those in the picture are the Micropolis drives, which are single-sided, quad-density, and have an effective storage capacity of approximately 300 kilobytes each. If the front panel of the drive doesn't look like the picture, then it is a Tandon drive, which is double-sided, quad-density, with a formatted storage capacity of approximately 600 kilobytes. The front panel, or disk-engaging mechanism, of a Micropolis drive works like the kitchen toaster - it pops up and down. The Tandon drive's mechanism works like an overhead garage door. The "garage-door" type of mechanism is now also used by the new Micropolis drives, but you won't find them in any Vector from the factory.

OK, let's assume that your system has a mainframe that looks like the picture, but the terminal is different. This would have to be a model "MZ", which was produced before the "System B", and was not supplied with a Vector Graphic terminal. It was up to the purchaser to supply his own terminal, which could be just about anything.

If your system has a terminal that looks like the picture, but has two Tandon drives instead of Micropolis drives, then it is a model "3100".

Let's continue on with the floppy-disk-only systems and leave the hard-disk systems for later. From this point on, just ignore the label on the terminal. It might say "Vector MT", "Vector 3", or just "Vector", as these were interchanged occasionally.

The "Vector 3" series differed from the "System B" setup in that everything was located inside the terminal housing, with the exception of the disk drive or drives. There was no separate mainframe, or "MZ", unit.

A "VIP" was a "Vector 3" with one floppy disk drive. The early model "VIP's" used a Micropolis drive, while later production models used a Tandon drive. The "VIP" was also known as a model "1600".

The model "2600" is the same as a "VIP", except that it uses two Tandon drives. I don't believe that any of the 2600's were produced with Micropolis drives.

Now for something with a little different wrinkle, the model "2800". The "2800" is the ONLY standard Vector system with 8-inch floppy disk drives! If your Vector has two 8-inch drives and the disk drive enclosure says "DUALSTOR", then it is without a doubt a model "2800". These drives are double-sided, double-density, manufactured by Qume, and have an approximate capacity of 1.1 megabytes each.

This covers all of the "floppy-only" systems. Now we are ready to explore the models with hard disks. Vector has used two different hard disks in the systems which we are about to discuss. The first is the Seagate model ST506 disk, which has a formatted capacity of 5 megabytes and is the same physical size as a 5 1/4-inch floppy disk drive. The other is a Quantum hard disk with a 32-megabyte capacity. This drive is much larger physically, and is housed in a box the same size as a "System B", or "MZ", mainframe.

The model "3005" is the same as a model "2600", except that one of the Tandon floppy drives has been replaced with the 5-megabyte hard disk. The model "3032" looks the same as a "System B", except that the mainframe-sized unit has only one Tandon floppy drive with the Quantum hard disk hidden inside. All computing electronics actually reside inside the terminal as with any other of the "Vector 3" series. The model "3105" is the same as a "3100", except that one of the Tandon drives is replaced with a 5-megabyte hard disk. Since the "3100" and the "3105" have the "MZ" mainframe, the user can add many more S-100 cards to his system than can be put into a "2600" or a "3005".

Well, we've about beat the single user systems to death, so now let's work on the multiuser systems for a while. There are only two basic models, so it shouldn't take very long. These both belong to the "Vector 5" family.

First is the model "5005", which will handle up to five users (terminals) and has a 5-megabyte hard disk. This system looks exactly like a model "3105", except that it will have two or more terminals attached. Many times these models will be referred to as a "5005/X", where "X" is replaced by the number of terminals attached. A system with 3 terminals would be a "5005/3".

The "5032" is the same as the "5005" except it has a 32-megabyte hard disk instead of the 5 megabyte. This system's distinguishing feature is that it is the only Vector system with two mainframe-sized cabinets. One "box" contains all computing electronics, and one Tandon floppy drive, while the other contains the 32-megabyte hard disk.

This series was changed to the "Vector 5E" series about a year ago. This differs from the "Vector 5" series in that an entirely different terminal is used and that the system is equipped with Extended CP/M. The terminals have a green phosphor screen and a detached keyboard.

There are a couple of the oldest systems which I have not covered at all, because I am entirely unfamiliar with them. These are the "Vector 1" and the "3030".

I hope that you will find my efforts worthwhile in helping you to identify the different models of Vector Graphic computers. To the best of my knowledge, this is an accurate description of all original configurations as they were shipped from the factory. If you need help in identifying something labeled "Vector", give me a call and we will do what we can to help.

.....

ED Note: Lou Woody is an authorized Vector dealer. In fact, Vector is the only line he handles. Lou has told me that he will try and help all us folks who need parts, manuals, and software for the older systems. As he said in his article, call him at (913) 432-4474, or write him at the address shown in the article title.

What Lou doesn't realize yet, is that he's going to be doing a lot of explaining, and probably a lot of research. What we MUGies have to realize is that Lou's time is money, and we have to be careful of not inundating him with questions without also compensating him with business. I'm not trying to discourage anyone from contacting him, just trying to figure out how we can keep him involved in our organization. Perhaps the MUG can help by publishing the answers to the most frequently asked questions.

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CLASSIFIED  
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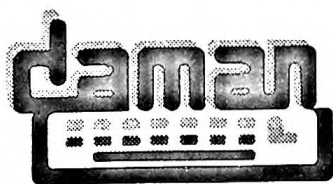
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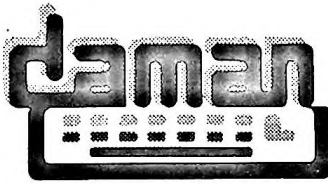
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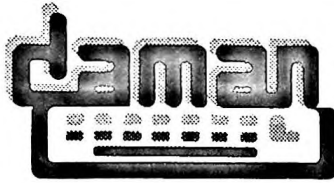
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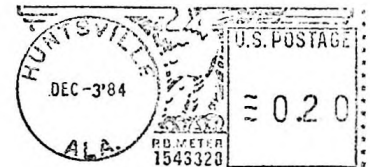


December 1984 - A05

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